

**Toxics Use Reduction Institute**

**Policy Analysis: Draft Recommendations on CERCLA chemicals  
that have never been reported by TURA filers**

**April 29, 2008**

Statutory amendments to the Toxics Use Reduction Act (TURA) in 2006 required the Science Advisory Board (SAB) and TURI to review the existing chemicals on the TURA Toxic or Hazardous Substances List originating from the CERCLA chemical list and make a recommendation to the Council as to which chemicals should be retained. The Council has until August 1, 2008, to make decisions taking these recommendations into account. The goal of this process is to help facilities focus their efforts more closely on substances that present greater hazards to human health and the environment in Massachusetts.

The SAB has considered the CERCLA chemicals in two broad groups: chemicals that have been reported at some point by TURA filers, and chemicals that have never been reported by TURA filers. This document presents information on those chemicals that have never been reported by TURA filers.

- The SAB has found a scientific basis to recommend retaining the majority of the CERCLA substances discussed in this document. Specifically, of 260 substances considered here, the SAB has recommended retaining 198 and taking no action on 29. The SAB has yet to make a decision on 33 chemicals.
- TURI supports all of the SAB's recommendations for no action.
- Based on information about expected use in Massachusetts, TURI has also recommended no action on many of the substances that the SAB has recommended retaining. These recommendations are based on expected use patterns, and do not indicate an absence of inherent hazard. For the 33 substances on which the SAB is undecided, TURI has not yet developed a recommendation.

For any substances that are retained, there would be no change in reporting and planning requirements. For substances on which the Council takes no action, those substances would drop off the list.

This policy analysis summarizes the scientific information reviewed by the Science Advisory Board in developing its recommendations. In addition, it provides an overview of expected uses of these substances, as well as selected regulations that apply to these substances at the federal level.

## **1. Overview**

The CERCLA substances list applies to Superfund hazardous waste sites and chemical accidents and spills. Substances that are found on the CERCLA list originated from four other federal regulatory lists: Clean Air Act list of hazardous air pollutants (HAPs), Clean Water Act list of hazardous substances and priority pollutants, Solid Waste Disposal Act list of hazardous wastes, and Toxic Substances Control Act list of imminent hazards.

There are nearly 500 chemicals on the CERCLA list that do not overlap with the EPCRA list. The majority have never been reported under TURA. In order to make this list manageable, the SAB considered the chemicals in groups.

- ***Substances listed in categories (160).*** 160 of the substances currently appear on the TURA list in two forms: as individual listings from the CERCLA list, and as members of categories from the EPCRA/TRI list. Under TURA reporting rules, these chemicals have always been reportable as the EPCRA category. Thus, the individually listed substances can be removed from the TURA chemical list for simplicity, while their reporting requirements remain unchanged.
- ***Substances reported under TURA (81).*** There are 81 CERCLA-only substances that have been reported at some point under TURA.
- ***Substances never reported under TURA (260).*** The majority of the CERCLA-only substances have never been reported under TURA. These chemicals have not been used over threshold (10,000/25,000 pounds) during the 16 years for which data is available. Thus, they are not likely to be a priority for the program unless significant new uses emerge or they are potential Higher Hazard substances for which the reporting threshold might be lowered. These 260 substances are the subject of this document.
  - To facilitate the review process for this large group of non-reported chemicals, TURI and the SAB broke the substances down into nine groups. Six groups (Acetates, Amines, Ammonium Compounds, Arochlors, Benzene related compounds, and Phenols) are defined by chemical structure. One group (Pesticides) is defined by use category; one (IARC 1, 2, & 3) is defined by health effects; and a final group (Uncategorized) contains all substances that did not fall into one of the other categories. These groups are listed in Appendix 1, along with information on the SAB's votes on each.

## 2. Information considered by the SAB

The substances recommended by the SAB for retention pose concerns based on health, safety, or environmental criteria. Specific data for each substance are shown in Appendix 3. In addition to the data shown in Appendix 3, in some instances individual SAB members brought additional scientific information to the meeting. The SAB considered the following data:

- International Agency for Research on Cancer (IARC) rating. The SAB recommended retaining any substance that has an IARC rating (Group 1, 2, or 3). 64 substances were recommended for retention on this basis.
- Data from the EPA PBT profiler (persistence in water, soil, sediment, and air; bioconcentration factor; and chronic toxicity in fish).<sup>1</sup>
- Neurotoxicity (based on Scorecard's list of suspected neurotoxicants, and other sources in some cases).<sup>2</sup>
- Developmental/reproductive toxicity (based primarily on California's Proposition 65 list, and other sources in some cases).<sup>3</sup>
- Mutagenicity (based on the European Union's Consolidated List of Carcinogens, Mutagens, and Reproductive Toxicants [CMR], and other sources in some cases).<sup>4</sup>
- Lethal dose or concentration information (LD50 and LC50).
- Exposure limits required or recommended by Federal agencies, including reference dose and reference concentration (RfD and RfC, from EPA Integrated Risk Information System)<sup>5</sup>; ATSDR

Minimum risk level (MRL); NIOSH Recommended Exposure Limit (REL); Threshold Limit Value – Time Weighted Average (TLV-TWA); and Threshold Limit Value – Short Term Exposure Limit (TLV-STEL).<sup>6</sup>

- Flash point.

### 3. Sources of Use Information

None of the substances considered here has been reported under TURA in the 16 years of TURA filing, indicating that none has been “manufactured or processed” above 25,000 pounds per year or “otherwise used” above 10,000 pounds per year. Past use is likely to be a reasonably good predictor of future use, suggesting that most of these substances are unlikely to be used in large quantities in the future. However, it is possible that some are being used below current TURA thresholds. Use under threshold is particularly important for substances that might be designated in the future as Higher Hazard Substances, as well as for substances whose use is expected to increase significantly in the future.

TURI has relied primarily on the following resources in its effort to assess use under threshold.

- TURI consulted the New Jersey Hazardous Substance Fact Sheets to obtain information on the sectors and applications in which a given substance is used.
- TURI consulted the Pesticide Action Network’s Pesticide Information database to determine which of the pesticides on the list are banned or restricted in the US and other countries, and to identify their uses (e.g. fungicide, insecticide, antimicrobial, etc.).
- Since Biotechnology is an emerging industry in Massachusetts, there may be new and growing uses of some CERCLA substances in this sector. TURI staff consulted with an individual who works in the industry, an industry association, and a Local Emergency Planning Committee to identify substances with potentially emerging/increasing uses.
- *EPA Section 302 Extremely Hazardous Substances*. Approximately one quarter of the CERCLA-only substances that have never been reported under TURA are on EPA’s Section 302 Extremely Hazardous Substances list. These substances are reportable to EPA for Threshold Planning Quantities between 100 and 10,000 pounds. Of these substances, EPA has received data on only four, indicating that the rest have not been used in significant quantities. (Of these four, two are in the reported group and are recommended for retention, and one is part of a category.)
- *EPA High Production Volume (HPV) Sponsored Chemical List*. Twenty-two of the CERCLA-only substances that have never been reported under TURA are on EPA’s HPV list, indicating that they have been produced at over 1 million pounds per year.
- TURI also consulted with staff at the Office of Technical Assistance (OTA) to determine their experiences with the use of these substances under threshold in Massachusetts.
- Finally, TURI consulted the *Chemical Economics Handbook* to gather additional information on selected substances.

### 4. Use information, SAB recommendation, and TURI recommendations

In this section, we present the SAB’s recommendations for each group; information on use of the substances; and TURI’s recommendation, which takes into account both the SAB recommendation and the use information.

**A. Acetates (6)**

There are 6 substances in the acetate group that have never been reported under TURA. (There are also several that have been reported; these are addressed in a separate document.) All are used as solvents used in a wide variety of applications. One important application is in manufacture of cosmetics. Use information for the six substances is shown in Table A. Based on historical and existing use information, it is likely that these substances are currently used in Massachusetts below TURA reporting thresholds, and that they will continue to be used. It is reasonable to expect that facilities in TURA covered SIC codes could increase their use of one or more of the substances on this group above TURA thresholds in the future.

*SAB recommendation.* The SAB is still deliberating about the substances in this group, and will make a final recommendation in May 2008.

*TURI recommendation.* TURI has not yet developed a recommendation on these substances, pending a decision by the SAB.

<b>Table A: Acetates: Use information</b>	
sec-Butyl acetate	Widely used as a solvent for various purposes.
iso-Amyl acetate	Used as a solvent, in perfumes and in artificial fruit flavorings
Uranyl acetate	Used as a laboratory reagent, in drying copy inks, and as an activator in bacterial oxidation process.
tert-Amyl acetate	Used as a solvent for lacquers and paints, in the extraction of penicillin and as nail polish.
sec-Amyl acetate	Widely used as a solvent for various purposes.
Ammonium acetate	Used as a chemical reagent, as a medication, and a meat preservative, and to make drugs, foam rubber, vinyl plastics and explosives. This chemical is a HPV.
Source: New Jersey Hazardous Substance Fact Sheets, accessed via ExPub, January-April 2008	

**B. Amines (11)**

There are 11 substances in the amine group that have never been reported under TURA. These substances are used as intermediates in making dyestuffs, pharmaceuticals and other chemicals. In some cases they chemicals have direct medical applications. Use information for these substances is shown in Table B.

*SAB recommendation.* Based on hazard, the SAB recommended retention of all chemicals in this group.

*TURI recommendation.* Based on use information, TURI supports the SAB's recommendation for six of the substances, and recommends no action on the other five. TURI welcomes any additional data that Advisory Committee members may provide on any of these substances.

- TURI supports the SAB's recommendation to retain the following substances: p-Toluidine, n-Propylamine, Butylamine, tert-Butylamine, iso-Butylamine, and N,N-Diethylaniline. Although these substances are not currently used above TURA thresholds, it is reasonable to expect that a manufacturing facility could begin using one or more of them above TURA thresholds in the future.
- TURI recommends no action on the following five substances: Dipropylamine because it is unlikely to be used in Massachusetts manufacturing; 5-(Aminomethyl)-3-isoxazolol and Diphenylhydrazine because use is likely to be low volume; 1-Acetyl-2-thiourea because it is not manufactured or used

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industrially in the US; and methapyrilene, because as a medication it is unlikely to be a priority for the TURA program.

<b>Table B: Amines: Use Information</b>		
<b>Chemical name</b>	<b>Use information*</b>	<b>TURI comments</b>
p-Toluidine	Intermediates for dyestuffs and pharmaceuticals	Likely to be used. This chemical is a HPV. Retain.
n-Propylamine	Intermediates in mfg. medicinal, agricultural, textile, rubber & plastic chemicals	Likely to be used. Retain.
Butylamine	Used in making rubber, drugs, dyestuffs, insecticides and pharmaceuticals.	Likely to be used. This chemical is a HPV. Retain.
Dipropylamine	Chemical intermediate in the manufacture of herbicides	As a chemical intermediate used in the manufacture of herbicides, this substance is unlikely to be used in Massachusetts manufacturing. No action.
5-(Aminomethyl)-3-isoxazolol	Used as medication and in medical studies	Use likely to be low volume. Reportable to EPA if used above 500 lbs; has never been reported to EPA Region 1. No action.
Diphenylhydrazine	As reagent for arabinose & lactose 1,1-diphenylhydrazine hydrochloride	Use likely to be low volume. No action.
1-Acetyl-2-thiourea	Not manufactured or used industrially in the US	Unlikely to be used in MA. No action.
tert-Butylamine	Used in the preparation of insecticides, pharmaceuticals, oil additives and rubber accelerators	Likely to be used in MA. This chemical is a HPV. Retain.
iso-Butylamine	Used in the manufacture of insecticides and other chemicals, and in the processing of wool products	Likely to be used in MA. Retain.
N,N-Diethylaniline	Used in organic synthesis and as a dyestuff intermediate	Likely to be used in MA. This chemical is a HPV. Retain.
Methapyrilene	Medication	Low priority for TURA program. No action.
*Source: New Jersey Hazardous Substance Fact Sheets, accessed via ExPub, January-April 2008		

### **C. Ammonium Compounds (19)**

There are 19 ammonium compounds that have never been reported under TURA. Primary uses of ammonium compounds are as preservatives, in chemical manufacturing, photographic applications, pharmaceuticals, and as buffer salts.

*SAB recommendation.* Based on hazard, SAB recommended retention of 5 of these compounds, and recommended no action on 14 compounds.

- Table C1 shows use information for the 5 substances recommended for retention by the SAB.
- Table C2 shows use information for the 14 substances recommended for no action by the SAB.

*TURI recommendation.*

- Based on the use information shown in Table C1, TURI believes that the five substances recommended by the SAB for retention are unlikely to be used by TURA covered facilities above TURA thresholds in the future. For this reason, TURI recommends no action on these substances. TURI welcomes any additional data that Advisory Committee members may provide on any of these substances.
- TURI supports the SAB's recommendation to take no action on the 14 substances listed in Table C2. Of those the SAB recommended for no action, three substances in this group have been identified as potentially used in smaller quantities, for example in biotech applications.

**Table C1: Ammonium Compounds recommended for retention by SAB**

Chemical name	Use information*	TURI comments
Ammonium carbamate	Used as a fertilizer and an ammoniating agent.	Use likely to be low volume
Ammonium sulfide	Manufacture of surfactants, photocopy paper.	Use likely to be low volume
Ammonium picrate	Used in explosives, fireworks and as a rocket propellant.	Use likely to be low volume (no manufacturers of fireworks, explosives, or rocket propellants in MA)
Ammonium benzoate	Used as a preservative and in medicines.	Use likely to be low volume
Ammonium carbonate	Used to make Ammonia salts, fire extinguishing agents and baking powders.	Use likely to be low volume; used in small biotech applications.

\*Source: New Jersey Hazardous Substance Fact Sheets, accessed via ExPub, January-April 2008

**Table C2: Ammonium Compounds recommended for no action by SAB**

Chemical name	Use information*
Ammonium bisulfite	Used as a preservative, as a hair waving and bleaching agent, and to make other chemicals.
Ammonium sulfite	Used in medicines, photography, hair wave solutions, and to make other chemicals.
Ferric ammonium citrate	Used in photography, for blueprints, and as a medication.
Ammonium fluoborate	Used in the metal industry, as a catalyst and in flame retardants.
Ammonium oxalate	No information available at present.
Ammonium tartrate	Topical Ophthalmic; Textile Industry; Medicine
Ferric ammonium oxalate	In photography; blueprints; in coloring of Al and Al alloys
Ammonium citrate, dibasic	Used in pharmaceuticals and rustproofing compounds, and in chemical analysis

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Ammonium tartrate	Used in the textile industry and in medicine.
Ferric ammonium oxalate	No information available at present.
Ammonium oxalate	No information available at present.
Ammonium oxalate	Mfg explosives; leather finishes; electrolyte detinning of Iron; Dyeing; Mfg blueprint paper; metal polishes; detection of Ca, Pb, and Rare Earths
Ferrous ammonium sulfate	Used in photography, analytical chemistry and Iron-plating baths.
*Source: New Jersey Hazardous Substance Fact Sheets, accessed via ExPub, January-April 2008	

#### **D. Arochlors (6)**

There are 6 substances in the Arochlor group: Arochlor 1260, 1221, 1232, 1248, 1016, and 1242. None has been reported under TURA. Arochlor is a trade name for a family of commercial mixtures of polychlorinated biphenyls (PCBs). These chemicals were used in the past primarily as insulating fluids. Production of PCBs has been banned in the US since the 1970s, although they continue to be used in some limited applications.

It is likely that some Massachusetts facilities are currently using PCBs in the Arochlor group. However, due to both legal restrictions and voluntary phaseouts, use of these substances is expected to decline over time. Thus, given that no facility reports use of these substances at present, it is highly unlikely that use will increase in the future.

Based on hazard, the PCBs in the Arochlor group would be reasonable candidates for designation as Higher Hazard Substances, in which case the 1,000 pound threshold would apply. Again, however, it is highly unlikely that any facility would be using the substances at this volume either now or in the future.

#### **E. Benzene related compounds (16)**

Uses of benzene related compounds include use in dyes, as solvents, chemical manufacturing, medicinal applications, photography, and explosives. Use information is shown in Table E. TURI welcomes any additional data that Advisory Committee members may be able to provide on use of any of these substances.

*SAB recommendation.* Based on hazard, The SAB recommended retention of all substances in this group.

*TURI recommendation.* TURI supports the SAB's recommendation to retain nine of the substances in this group. Based on expected use patterns, TURI recommends taking no action on the remaining seven substances.

<b>Table E: Benzene related compounds: Use information</b>		
<b>Chemical name</b>	<b>Use information</b>	<b>TURI comments &amp; tentative recommendations</b>
4-Bromophenyl phenyl ether	Research chemical and fire retardant	Research chemical likely to be used at low volume only. Flame retardant application may be an emerging use, suggesting possible future increase in volume. Retain.
Benzenethanamine, alpha,alpha-dimethyl-	Anorectic/Anorexigenic drug used to treat obesity	Low priority for TURA program. No action.
Nitrotoluene	Used in the manufacture of dyes, rubber, agricultural chemicals, explosives and other chemicals	Basic feedstock chemical; likely to be used; increased volume in future is possible. Retain.
Dinitrobenzene (mixed isomers)	Used in making dyes, other chemicals & explosives	Future increase in use is possible. Retain.
Calcium dodecylbenzenesulfonate	Salt of surfactant	Future increase in use is possible. Retain.
Triethanolamine dodecylbenzene sulfonate	Household detergent products	Future increase in use is possible. This chemical is a HPV. Retain.
Isopropanolamine dodecylbenzene sulfonate	As a surface active ingredient in soaps and detergents	Future increase in use is possible. Retain.
Diaminotoluene (CAS # 496-72-0)	Dyes & preparation of toluene diisocyanates	Future increase in use is possible. This chemical is a HPV. Retain.
Epinephrine	Medical and Veterinary applications; <i>see file</i>	Low priority for TURA program. No action.
3,4-Dinitrotoluene	Explosives, propellants, in the manufacture of toluene diisocyanates, dye intermediates	Future increase in use is possible. Retain.
Diaminotoluene (CAS # 823-40-5)	No use information is listed in ExPub for this CAS number; however, the following information is available for the same chemical name with another CAS number: Dyes & preparation of toluene diisocyanates. This substance was formerly listed as a High Production Volume (HPV) chemical. However, in 2002 the manufacturer, Lyondell, requested that EPA change the designation to "no longer HPV," because the firm now reports a generic mixture of several isomers, rather than individual isomers.	Because this substance is used as an intermediate in chemical manufacturing, it is unlikely to be used by Massachusetts manufacturers. No action.
1,2,4,5-Tetrachlorobenzene	Used in production of herbicides, defoliants & insecticides	Because this substance is used as an intermediate in manufacture of pesticides, it is unlikely to be used by Massachusetts manufacturers. No action.
Benzenesulfonyl chloride	Used as an intermediate and as a reagent in making other chemicals	Because this substance is an intermediate in chemical manufacturing, it is unlikely to be used in significant quantities by Massachusetts manufacturers. No action.
1,3,5-Trinitrobenzene	Used as an explosive; as an acid-base indicator, and in the production of rubber	Because the primary use of this substance is as an explosive, it is unlikely to be used in significant quantities by Massachusetts manufacturers. No action.
Benzonitrile	Used as a solvent for nitrile rubber, specialty lacquers, resins, polymers & metal salts	Future increase in use is possible. Retain.



## **F. Pesticides (88)**

Of the 88 substances in the pesticide group, nearly half have been banned or restricted in the US or other countries. Because agricultural and ancillary facility uses are not covered under TURA, pesticides have historically been used in few TURA-covered uses in Massachusetts. Significant existing or emerging covered uses include intermediates in organic synthesis; treatments in medicinal applications; and additives to antimicrobial products (including wood preservatives, antifoulants in coatings, and antibacterials in plastics). Many of the substances in the pesticide group are banned or restricted in the US and/or in other countries.

### *SAB recommendation.*

- The SAB recommended retaining all the pesticides that are banned or restricted in the US and/or in other countries (see Table F1).
- In addition, the SAB recommended retaining the majority of the other substances in this group (see Table F2).
- The SAB recommended no action on a smaller number (see Table F3).
- The SAB remains undecided regarding four substances: one 2,4,5-T ester and three 2,4,5-T amines. The SAB will reconsider these four remaining pesticides at its next meeting.

*TURI recommendation.* TURI has not identified any emerging uses of the pesticides on this list. Because none are expected to be used in significant quantities by firms in TURA-covered SIC codes, the Institute recommends taking no action on this entire group.

**Table F1: Pesticides that are banned or restricted in the US and/or other countries:  
recommended for retention by SAB**

<b>Chemical Name</b>	<b>Ban/Restriction information</b>	<b>Registered in US</b>	<b>Chemical class; Use Type</b>
Endosulfan sulfate	Parent chemical (Endosulfan) is banned/restricted in US or elsewhere.	No	Organochlorine; Breakdown product
Endosulfan	Global ban being considered under Stockholm Convention. Banned in multiple countries; not banned in US.	Yes	Organochlorine; Insecticide
beta – Endosulfan	Parent chemical (Endosulfan) is banned/restricted in US or elsewhere.	No	Organochlorine; Insecticide
Endrin aldehyde	Parent chemical (Endrin) is banned/restricted in US or elsewhere.	No	Organochlorine; Breakdown product
alpha – Endosulfan	Parent chemical (Endosulfan) is banned/restricted in US or elsewhere.	No	Organochlorine; Insecticide
Carbamic acid, 1H-benzimidazol-2-yl,methyl ester	Banned, Restricted or Cancelled. Restricted in Sweden; not banned in US.	Yes	Benzimidazole; Fungicide, breakdown product. This chemical is a HPV.
2,4-D Esters	Parent chemical (2,4-D) is banned/restricted/cancelled in US or elsewhere.	No	Chlorophenoxy acid or ester; Herbicide
2,4,5-T esters	Parent chemical (2,4,5-T) is banned/restricted/cancelled in US or elsewhere; not legal for import.	No	Chlorophenoxy acid or ester; Herbicide
2,4-D Esters	Parent chemical (2,4-D) is banned/restricted/cancelled in US or elsewhere.	No	Chlorophenoxy acid or ester; Herbicide

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2,4,5-T esters	Parent chemical (2,4,5-T) is banned/restricted/cancelled in US or elsewhere; not legal for import	No	Chlorophenoxy acid or ester; Herbicide
2,4-D Esters	Y; Located on the Banned or Severely Restricted Pesticides List (US-EPA).	Yes	Chlorophenoxy acid or ester; Herbicide
2,4,5-T esters	Parent chemical (2,4,5-T) is banned/restricted/cancelled in US or elsewhere.; not legal for import	No	Chlorophenoxy acid or ester; Herbicide
Chlorpyrifos	Banned/restricted/cancelled in US or elsewhere.	Yes	Organophosphate; Insecticide, Nematicide
2,4,5-TP esters	Banned in multiple countries; not banned in US.	No	Chlorophenoxy acid or ester; Herbicide
2,4-D Esters	Parent chemical 2,4-D is banned/restricted/cancelled in US or elsewhere.	No	Chlorophenoxy acid or ester; Herbicide
Ethion	May be banned/restricted/cancelled in US or elsewhere (more data needed).	No	Organophosphate; Insecticide
2,4,5-T esters	Banned in Argentina, not banned in US.	No	Chlorophenoxy acid or ester; Herbicide
2,4-D Esters	Parent chemical 2,4-D is banned/restricted/cancelled in US or elsewhere. On CA Air Contaminants OSHA Act list.	Not listed in PAN database	Chlorophenoxy acid or ester
2,4,5-T amines	Parent chemical 2,4,5-T is banned/restricted/cancelled in US or elsewhere; not legal for import	No	Chlorophenoxy acid or ester; Herbicide

<b>Table F2: Pesticides recommended by the SAB for retention: not banned or restricted</b>		
<b>Chemical name</b>	<b>Use information</b>	<b>EPA registered?</b>
Endothall	Used to control weeds, as a defoliant, and a desiccant	Yes
4-Aminopyridine	Used to control crows, pigeons & other birds; also used as a chemical intermediate and as a medicine	Yes
Hexachloropropene	Used as a solvent, plasticizer, and hydraulic fluid	No data found
1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-,O-[(methylamino)carbonyl]oxime	Nematicide. Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1.	No
Diisopropylfluorophosphate	Ophthalmic cholinergic; miotic in veterinary practice; In treatment of human glaucoma; insecticide; studied as potential warfare agent (nerve gas)	No
Bis(dimethylthiocarbamoyl) sulfide	Vulcanisation accelerator; booster for thiazoles especially in nitrile rubbers	This chemical is a HPV.
<i>Carbamates:</i>		
Carbamic, (3-chlorophenyl)-,4-chloro-2-butynyl ester	Former use selective post-emergence herbicide	No
Carbamic acid, methyl- 3-methylphenyl ester	Used as an insecticide to control citrus mealybugs and cotton aphids	No
Carbamic acid,dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazol-5-yl ester	Systemic aphicide, insecticide	No
Carbamothioic acid, dipropyl-, S-propyl ester	Selective soil incorporated herbicide	No
Carbamothioic acid, bis(2-methylpropyl)-,	selective herbicide	Yes

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S-ethyl ester		
Ethanimidothioic acid, 2-(dimethylamino)-N-[[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester	Carbamate pesticide	Yes
Methanimidamide, N,N-dimethyl-N-[3-[[[(methylamino)carbonyl]oxylphenyl]-,monohydrochloride	Insecticide-Acaricide; effective against mites and bugs and used on fruit and alfalfa	Yes
Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester	Agricultural Chemical	No
Carbamic acid, dimethyl-,1-[[[(dimethylamino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester	Specific stomach insecticide for the control of fruit flies and other flies including strains which have developed resistance to chlorinated hydrocarbons and certain organophosphorous compounds	No
<i>Amines:</i>		
Methanamine	Used in making other chemicals and as a food additive	This chemical is a HPV.
<i>Botanicals (Pyrethrins):</i>		
Pyrethrins	Insecticide (stock & pet sprays, household sprays)	Listed as both yes and no in PAN regulatory database.
Pyrethrins	Insecticide (stock & pet sprays, household sprays)	No
Pyrethrins	Insecticide	No
<i>Phenols:</i>		
2-Cyclohexyl-4,6-dinitrophenol	Used as an insecticide	No
Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate	Insecticide	No
Phenol, 3-(1-methylethyl)-, methyl carbamate (m-Cumenyl methylcarbamate)	Insecticide	No
<i>Phosphates:</i>		
O,O-Diethyl S-methyl dithiophosphate	Possesses insecticidal, acaricidal, and fungicidal activity; also as intermediate for organic synthesis	No data found
Hexaethyl tetraphosphate	Acaricide, insecticide for soft bodied insects; mites	No
<i>Naphthalenes:</i>		
Dichlone	Used as a seed disinfectant, fungicide & insecticide	No
1,4-Naphthoquinone	Used in the production of rubber, polyester resins, dyes, pharmaceuticals & pesticides	No data found
<i>Benzene related compounds:</i>		
Pentachlorobenzene	Synthesis of pentachlorobenzene; fungicide; flame retardant	No data found

<b>Table F3: Pesticides recommended by the SAB for no action</b>	
<b>Chemical name</b>	<b>Use</b>
Ethanimidothioic acid, 2-(dimethylamino)-n-hydroxy-2-oxo-, methyl ester (A2213)	Agricultural Chemical
Carbamodithioic acid, (hydroxymethyl)methyl-,monopotassium salt (potassium n-hydroxymethyl-n-methyldithiocarbamate)	Agricultural Chemical
<i>Carbamates:</i>	
Thiofanox	Insecticide
<i>Amines:</i>	
sec-Butylamine	Fungistat
sec-Butylamine	Agricultural Chemical
<i>Phenols:</i>	
Methanimidamide, N,N-dimethyl-N-[2-methyl-4-[[[(methylamino)carbonyl]oxy]phenol]-	Carbamate pesticide

**G. Phenols (7)**

There are seven substances in the phenols group. These substances are primarily used in chemical manufacturing and the manufacture of dyes, pesticides and pharmaceuticals. Table G shows use information for these substances.

*SAB recommendation.* Based on hazard, The SAB recommended retention of all chemicals in this group.

*TURI recommendation.* Based on use data, TURI recommends retention of five of the seven substances, as shown in Table G.

<b>Table G: Phenols: Use information</b>		
<b>Chemical name</b>	<b>Use information</b>	<b>TURI comments and recommendations</b>
Xylenol	Used in the manufacture of pesticides, pharmaceuticals, plasticizers, and rubber chemicals, and as an additive to lubricants and fuels.	This chemical is a HPV. Retain.
7-Benzofuranol,2,3-dihydro-2,2-dimethyl-	Used to manufacture carbofuran.	As a chemical intermediate used in manufacture of the pesticide carbofuran, this substance is unlikely to be used in Massachusetts. No action.
1,3-Benzodioxol-4-ol,2,2-dimethyl-	Used to manufacture bendiocarb.	As a chemical intermediate used in manufacture of the pesticide bendiocarb, this substance is unlikely to be used in Massachusetts. This chemical is a HPV.No action
Nitrophenol (mixed isomers)	Used as a chemical indicator and intermediate	Retain
2,5-Dinitrophenol	Mfg of dyes and organic chemicals and as a pH indicator. Preservation of timber and manufacture of photographic developer.	Retain
m-Nitrophenol	Used to make dyestuffs, pesticides, other chemicals & indicator solutions.	Retain
2,6-Dinitrophenol	Dyes, esp. sulfur colors, picric acid, picramic acid, preservation of lumber, mfg of photographic developer diaminophenol hydrochloride and explosives.	Retain

**H. Non-categorized**

The chemicals in this miscellaneous group have a wide variety of uses including chemical manufacturing, intermediates, catalysts, plastics and pharmaceutical production.

*SAB recommendation.* Based on hazard, The SAB recommended retaining \_\_\_ substances and no action on eleven substances (Piperidine, Sulfur phosphide, Sodium bifluoride, Zirconium potassium fluoride, Acenaphthylene, 1,3-Pentadiene, Ferric fluoride, iso-Butyric acid, Zirconium tetrachloride, sodium phosphide, and sodium bifluoride). The SAB identified fourteen substances as substances that could

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potentially be designated as Higher Hazard substances in the future. These are listed in Table H1, along with use information where available. The SAB was undecided about ten substances.

*TURI recommendation.*

- The Institute recommends retaining thirteen potential Higher Hazard Substances and taking no action on one.
- Of the substances that the SAB recommended for retention but did not identify as potential Higher Hazard Substances, the Institute recommends retaining five and taking no action on three, and has not yet made a recommendation on one.
- The Institute recommends taking no action on the nine chemicals for which the SAB recommended no action.
- The Institute has not yet made a recommendation on those chemicals on which the SAB was undecided.

<b>Table H1: Non-Categorized Substances recommended for retention by SAB: Potential candidates for Higher Hazard substance designation</b>		
<b>Chemical name</b>	<b>Use information</b>	<b>TURI comments and recommendation</b>
Phosphorous trichloride	Used in gasoline additives and textile finishing, and to make other chemicals, pesticides, dyestuffs, catalysts and plasticizers.	Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1. Provisional recommendation of no action.
Methyl ethyl ketone peroxide	Used in making resins and polymers and is usually blended with another chemical to reduce its sensitivity to shock.	This chemical is a HPV.Retain.
2,4,5-T salts		Retain.
1,3-Dichloropropane		Retain.
Acenaphthylene		Retain.
Dichloropropane	Solvents, intermediates and soil fumigants (revisit - also see additional information in spreadsheet)	Retain.
Dichloropropene		Retain.
beta-BHC	Insecticide; listed under undecided.	Retain.
Carbonic difluoride	Used as a chemical intermediate in organic synthesis. Also used as a military poison gas.	Retain.
Acetyl bromide	Used in making dyes and organic chemicals.	Retain.
Methanesulfonyl chloride, trichloro-	Used as a fungicide, as a dye intermediate and to make other chemicals.	Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1. Provisional recommendation of no action.
Bromoacetone	Used as a chemical war gas and in organic synthesis.	Retain.
Acetyl chloride	Used to make pharmaceuticals and pesticides	Retain.
2-Chloronaphthalene	No commercial uses	No action.

<b>Table H2: Non-Categorized substances recommended for retention by SAB (not identified as potential Higher Hazard substances)</b>		
<b>Chemical name</b>	<b>Use information</b>	<b>TURI comments</b>
Nitrogen dioxide (N2O4)	No information available at present	Recommendation pending.
2-Chloroethyl vinyl ether	Used in the manufacturing of cellulose esters, anesthetics, and sedatives.	Provisional recommendation to retain.
Sulfur monochloride	Chemicals production; fungicides; insecticides; rubber synthesis; dyes	Provisional recommendation to retain.
Dichloropropane	Solvents, intermediates and soil fumigants	Unlikely to be used in significant amounts by firms subject to TURA. No action.
1,1-Dichloropropane	May be present with 1,2-Dichloropropane in soil fumigant blends. OHMTADS	No action.
Chloroacetaldehyde	Used to make certain chemicals and as a fungicide to control algae and bacteria in water.	Provisional recommendation to retain.
Pyrrolo[2,3-b] indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-,	Drugs (mitotics); Natural Products; Ophthalmic solutions	Medical use; low priority for TURA program. No action.
Ethyl methacrylate	Used to make chemicals, plastics & resins	This chemical is a HPV.Used in plastics industry. Retain.
Chlorinated Naphthalene	Used in lubricants and as insulation for electrical wire	Used in wire and cable industry. Retain.
Sources: New Jersey Hazardous Substance Fact Sheets and Oil and Hazardous Materials Technical Assistance Data System, accessed via ExPub, January-April 2008.		

**I. IARC 1, 2, & 3 (64)**

*SAB recommendation.* Based on hazard, The SAB decided to retain all substances listed under IARC in groups 1 (known carcinogen), 2 (probable carcinogen), or 3 (possible carcinogen). Substances in this group represent a wide variety of chemical types and uses.

*TURI recommendation.* The Institute supports the SAB's recommendation to retain all the IARC substances in Group 1 and 2. For Group 3, the Institute provisionally recommends taking no action on most of these, based on expected use.

**Table I: IARC 1, 2, & 3**

Chemical name	IARC group	Use information	TURI comments
Chloroalkyl Ethers	1	Sample substance in this category: Used in making plastics and other chemicals, to treat textiles, and in the production of ion exchange resins.	
Coke Oven Emissions	1		
Melphalan	1	Used as an anti-cancer drug and an insecticide	
Chlorambucil	1	Drug used in the treatment of cancer.	
Chlornaphazine	1	Antineoplastic drug (OHM/TADS, expub.com)	
Cyclophosphamide	1	Synthetic antineoplastic drug used in medicine.	
Diethylstilbestrol	1	Used as medication.	
Cacodylic acid	1	Used as an herbicide, soil sterilant and also in chemical warfare and in timber thinning.	
Phosphorus	1	Used in the manufacture of matches, Phosphorus compounds, fireworks, fertilizers, pesticides, electroluminescent coatings, and semiconductors. Reportable to EPA if used above 100 lbs/year. Has been reported to EPA Region 1 under Tier II.	
Oleum (fuming sulfuric acid)	1	Use in manufacture of chemicals, dyes, explosives, and in petroleum refining. Also used as a sulfating, sulfonating, and dehydrating agent. (OHM/TADS, expub.com)	

Aroclor 1254	2A	Used in insulating fluids of electrical systems	
4-Chloro-o-toluidine, hydrochloride	2A	Used to make dyes for cotton, silk, acetate, and nylon	
Hydrazine, 1,2-dimethyl-	2A	Used as a research chemical.	
Guanidine, N-	2A	Only commercial use is as a research chemical. May have been used	

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methyl-N'-nitro-N-nitroso-		in the late 1940s and 1950s in the laboratory preparation of diazomethane. Used for tumor induction and related research in experimental animals. Also used as a research mutagen. (OHM/TADS, expub.com)	
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Chlordane (Technical Mixture and Metabolites)	2B	Insecticide (PAN)	
DDT and Metabolites	2B	Chlorinated insecticide	
Dichlorobenzidine	2B	An intermediate in making dyes and pigments, and as a curing agent for Urethane foams.	
Fine mineral fibers	2B		
Heptachlor and Metabolites	2B	An Organochlorine insecticide.	
Hexachlorocyclohexane (all isomers)	2B	Insecticide (PAN)	
Heptachlor epoxide	2B	Breakdown product (PAN); Not available as a commercial product in the US. (OHM/TADS, expub.com)	
N-Nitrosodiethanolamine	2B	No evidence found for commercial production. Present at up to 3% in cutting fluids, compromising aqueous solutions of up to 45% triethanolamine and 18% sodium nitrite. (OHM/TADS, expub.com)	
Azaserine	2B	Used as an antibiotic and in biochemical research	
Kepone	2B	Used as an insecticide	
Hydrazine, 1,2-diethyl-	2B	Used in chemical laboratories as a research chemical	
D-Glucose, 2-deoxy-2-[[[(methylnitrosoamino)-carbo	2B	Used as a medicine to treat cancer.	
Furan	2B	Used in the manufacture of pharmaceuticals, agricultural chemicals, and other chemicals, and as a solvent for resins. Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1.	
Daunomycin	2B	Used as a medicine in treating cancer	
Lasiocarpine	2B	Used as a research chemical.	
Mitomycin C	2B	Used as an intravenous anti-cancer drug. Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1.	
DDT	2B	chlorinated insecticide	
Methane, tetranitro-	2B	Used as a rocket fuel, an additive to diesel fuel, and a reagent. Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1.	
Methylthiouracil	2B	Used as a medication for the treatment of thyroid disease (anti-thyroid agent).	



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DDD	2B	An Organochlorine pesticide which has been banned for use in the United States since the 1970's.	
DDE	2B	Breakdown product (PAN); DDE is a photolytic, thermal, and metabolic degradation product of DDT; it is not manufactured as a commercial product. (OHM/TADS, expub.com)	
N-Nitrosopyrrolidine	2B	Used as a research chemical.	

Chlorinated Ethanes	3	Uses for one substance in this category include: Used in making other chemicals, in refrigeration, as a solvent, and as a local anesthetic.	No action.
Endrin and Metabolites	3	An insecticide and to kill rodents. Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1.	No action.
Carbamic acid, phenyl-, 1-methylethyl ester	3	Herbicide (OHMTADS, expub.com), Plant growth regulator (PAN)	No action.
Maleic hydrazide	3	Used for weed control.	No action.
2-Butenal, (e)-	3	Used in making other chemicals and as a warning agent in gas fuels. Reportable to EPA if used in quantities greater than 1000 lbs/yr. Has never been reported to EPA Region 1.	No action.
Chlorodibromomethane	3	Used to manufacture fire extinguishing agents, aerosol propellants, refrigerants, and pesticides, and in organic synthesis. (OHM/TADS, expub.com)	Retain.
Pyrene	3	Currently, there is no commercial production or use of this compound. ( <a href="http://rais.ornl.gov/tox/profiles/pyrene_f_V1.shtml">http://rais.ornl.gov/tox/profiles/pyrene_f_V1.shtml</a> ). Reportable to EPA if used above 1000 lbs/year. Has never been reported to EPA Region 1.	No action.
Zirconium sulfate	3	Used as a chemical reagent and lubricant.	Retain.
Carbamodithioic acid, diethyl-,sodium salt (sodium diethyldithiocarbamate)	3	No information found at this time.	No action.
Benz[c]acridine	3	Occurs in engine exhaust. Found in coal combustion stack effluent, petroleum refinery incinerator effluents, and coal tar pitch volatiles from coke plants. (OHM/TADS, expub.com)	Retain.
Mexacarbate	3	Carbamate pesticide which is no longer used in the United States. Reportable to EPA if used above 500 lbs/year. Has never been reported to EPA Region 1.	No action.
Reserpine	3	Used as a medication.	No action.
Dieldrin	3	Sprayed as a liquid to control insects and termites. Its use has been restricted by EPA to soil injection for termite control.	Retain.
Endrin	3	An insecticide and to kill rodents.	No action.

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Saccharin and salts	3	Sodium or Calcium Saccharin is used in many low calorie or reduced calorie foods and also used in toothpaste, mouthwash and other dental care products.	
Thioperoxydicarbonic diamide, tetraethyl	3	Used as a fungicide, a seed disinfectant, in making rubber and as a prescription drug to treat alcoholism. This chemical is a HPV.	Retain.
m-Nitrotoluene	3	Organic synthesis (OHM/TADS, expub.com) This chemical is a HPV.	Retain.

## 5. Regulatory Context

Appendix 2 shows selected regulatory information for each of the substances, including whether the substance is identified as an EPA Clean Water Act Priority Pollutant; appears on the EPA Clean Water Act 311 List of Hazardous Substances; appears on the EPA Superfund Amendments and Reauthorization Act (SARA) 302A Extremely Hazardous Substances List; appears as a hazardous constituent under the Resource Conservation and Recovery Act (RCRA); is regulated as criteria air pollutants under the Clean Air Act; or meets the categorization criteria for the Government of Canada's Domestic Substances List categorization (indicating a need for further attention to these substances based on human health and/or environmental criteria).

## 6. Implications for the TURA Program

Since none of the substances considered here is currently reported under TURA, the immediate consequences of the Council's decisions on these substances for TURA filers and for the TURA program will be minimal.

Over the longer term, if facilities begin to use the substances on this list in larger quantities, facilities using substances that have been retained on the list may become subject to TURA requirements, while substances on which the Council takes no action will not be subject to these requirements.

The Institute has attempted to assess potential future use above threshold and retain where appropriate. For those substances on which the Council takes no action, the main effect will be to shorten the TURA list. The TURA program's approach to these substances will remain unchanged and implications for the TURA program are expected to be minimal. However, if use of any of these substances does increase, the TURA program will not receive data indicating this change. Thus, it will be particularly important for the TURA program to monitor emerging uses of these chemicals through other means.

<b>Appendix 1: Summary of SAB recommendations</b>		
<b>Group</b>	<b>Date(s) Considered by SAB</b>	<b>SAB Recommendation (All votes were unanimous unless otherwise noted.)</b>
Acetates (6)	1/29/08, 3/24/08	Pending decision at next meeting.
Amines (11)	1/29/08	Vote to retain all substances in this group.
Ammonium Compounds (19)	1/29/08	Vote to retain 5 substances: ammonium carbamate, ammonium sulfide, ammonium picrate, ammonium benzoate, and ammonium carbonate. The Board recommended taking no action on the remaining 13 substances.
Arochlors (6)	3/24/08	Vote to retain all chemicals in this group.
Benzene related compounds (16)	1/29/08	1/29/08: Vote to retain all except dodecylbenzene sulfonates. 3/24/08: The Board reviewed dodecylbenzene sulfonates and voted to retain.
Pesticides (88)	1/7/08, 3/24/08	1/7/08 Vote to retain all banned and restricted pesticides. 3/24/08 Vote to retain remaining pesticides with the exception of: Ethanimidothioci acid, 2-(dimethylamino-n-hydroxy-2-oxo-, methyl ester (A2213); Carbamodithioic acid (hydroxymethyl) methyl-, monopotassium salt, (potassium n-hydroxymethyl –n-methyldithiocarbamate); Thiofanox; Carbamic acid, dimethyl-,1-[(dimethylamino)carbonyl]-5-methyl-1H-pyrazol-3-y-1 ester; sec-Butylamine (this appears under two CAS numbers); Methanimidamide N,N-dimethyl-N-[2-methyl-4-[(methylaino)carbonyl]oxy]phenol]-
Phenols (7)	1/29/08	Vote to retain all substances in this group.
Non-categorized (43)	3/24/08	Vote to retain all chemicals in this group with the exception of: Piperidine, Sulfur phosphide, Sodium bifluoride, Zirconium potassium fluoride, Acenaphthylene, 1,3-Pentadiene, Ferric fluoride, iso-Butyric acid, Zirconium tetrachloride. Acenaphthylene vote was 4,1,1 for no action – to be revisited at next SAB meeting. Of those recommended for retention, 16 substances were identified as potential Higher Hazard Substances.
IARC 1, 2, 3 (64)	1/7/08	Vote to retain all IARC 1,2, & 3 carcinogens.

<sup>1</sup> EPA PBT Profiler, available at <http://www.epa.gov/oppt/sf/tools/pbtprofiler.htm>.

<sup>2</sup> Scorecard's list of suspected neurotoxicants, and the sources used to compile the list, is available at <http://www.scorecard.org/health-effects/> (select the link for neurotoxicity). Information on neurotoxicity of methylethylketone is drawn from the Fisher Scientific Material Safety Data Sheet (MSDS) for the substance.

<sup>3</sup> The California Proposition 65 List is available at [http://www.oehha.org/prop65/prop65\\_list/Newlist.html](http://www.oehha.org/prop65/prop65_list/Newlist.html). Additional information is drawn from the NIOSH Registry of Toxic Effects of Chemical Substances (RTECS); ReproEXPERT; Material Safety Data Sheets; and information presented by SAB members.

<sup>4</sup> The EU Consolidated CMR List is available at <http://www.chemicalspolicy.org/downloads/cmrlist.pdf>. Additional information is drawn from the US National Library of Medicine Toxicology Data Network (TOXNET).

<sup>5</sup> EPA Integrated Risk Information System, available at <http://www.epa.gov/iris/>.

<sup>6</sup> REL, TLV-TWA, and TLV-STEL are drawn from the National Institutes of Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards, available at <http://www.cdc.gov/niosh/npg/>.